TEXTILE WORLD RECORD
KINK BOOKS

No. 6

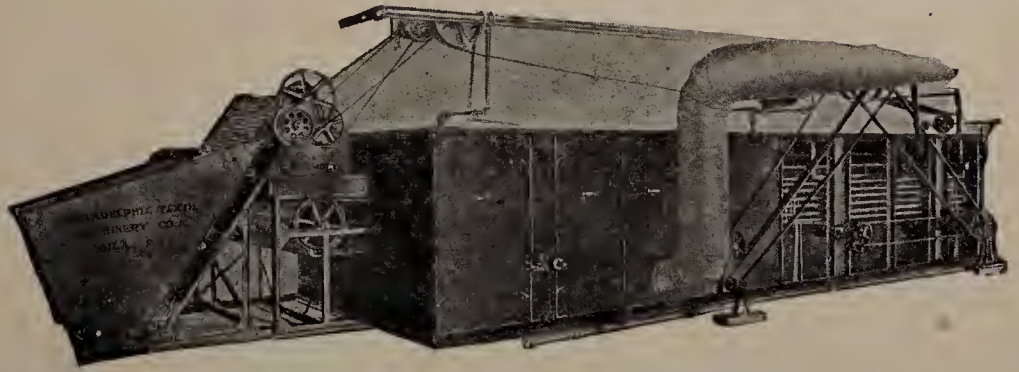
# Kinks on Wool and Worsted Finishing

Compiled from the
QUESTIONS AND ANSWERS DEPARTMENT
of the
TEXTILE WORLD RECORD
for its subscribers only

PRICE 75 CENTS

LORD & NAGLE COMPANY
Publishers
Boston, Mass., U. S. A.

# Proctor **DRYING MACHINES** Fire Proof



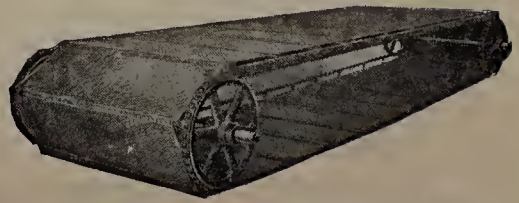
Yarn Dryers
Scouring Machines
Fans

## BUILT OF METAL

Stock Dryers
Carbonizers
Hosiery Dryers

**Apron troubles overcome by the Interlocking Chain Conveyor**

**It needs no adjustment**



Conveyor Separate from Dryer

Hancock and Somerset Sts. **Philadelphia Textile Machinery Company** Philadelphia, Penn.

1.25

# H. W. Butterworth & Sons Co.

PHILADELPHIA, PA.

PROVIDENCE OFFICE
Room 417, Industrial Trust Building

SOUTHERN AGENT
A. H. WASHBURN
Charlotte, N. C.

## Bleaching, Dyeing, Drying and Finishing Machinery

FOR TEXTILE FABRICS

THE TEXTILE WORLD RECORD
KINK BOOKS

No. 6

# Kinks for Wool and Worsted Finishers

Compiled from the
QUESTIONS AND ANSWERS DEPARTMENT
of the
TEXTILE WORLD RECORD
for its subscribers only

LORD & NAGLE COMPANY
Publishers
Boston, Mass., U. S. A.

# PREFACE

Very little attention has been given the subject of finishing woolen and worsted goods by textile writers. This is unfortunate as so important a branch of the woolen and worsted industries certainly would be benefited by the interchange of ideas of competent men on their work. All finishers must have felt at some time this lack of opportunity to compare experiences with others who have met the same difficulties.

The editors of the TEXTILE WORLD RECORD are at all times face to face with the problem of securing practical information. For years its subscribers have been invited to make free use of its columns in asking questions relating to textile manufacturing and it has occurred to us that if some of the most important and most interesting of the practical questions that have been answered were gathered together in a handy form for quick reference it would meet a wide-spread want.

This book is the result. It contains information which has been supplied by manufacturers, superintendents and overseers from their private note books and their stores of knowledge gained by experience.

It is offered free with a new subscription to the TEXTILE WORLD RECORD or with the renewal of an old subscription, and unless in the future we see some

good reason to change our policy it will not be sold to others. It is therefore available only to subscribers. As the subscription price of the TEXTILE WORLD RECORD is very low, amounting to less than eighteen cents a month or two dollars a year, Kinks for Wool and Worsted Finishers is certainly within the reach of anyone interested in its contents.

Many questions are answered and much information given in this book, but subscribers should remember that if there is any information they desire which is not given in this volume it is their privilege to ask the Questions and Answers Department of the TEXTILE WORLD RECORD, and every effort will be made to publish the information for them, provided the question is one of general interest to the trade.

No effort has been made to arrange the subjects in the order of precedence in manufacturing but the book is fully indexed, which should enable anyone to find the information he seeks in the shortest possible time.

Grateful acknowledgment is due to the men who have supplied the information, and if Kinks for Wool and Worsted Finishers should benefit any of the large number of men for whom it is intended, both they and the publishers will feel that its mission has been accomplished.

TEXTILE WORLD RECORD
LORD & NAGLE COMPANY
*Publishers*

# KINKS FOR
# WOOL AND WORSTED FINISHERS

## Difficulty in Fulling

Our fuller shrinks his cloth about three inches to the yard, but when the goods are finished they are about the same as when they left the loom. That is, they do not stay where he puts them, but stretch the three inches that he shrinks them and sometimes more. I think the trouble is in the fulling as it seems to me half an inch is enough to allow for stretch. The fuller runs the mills with the doors open and the pieces are very cold. Would that have anything to do with it? Marion (841).

I think "Marion" will find that running the goods stone cold has a good deal to do with the trouble as the wool fibre does not curl or twine so much when cold, in fact, it has an opposite effect. In addition to this the fuller may be fulling the goods almost up to width before beginning to full the length. Both should be started together, even if he has to stop trapping them when up in length to get the width right. Of course there is more strain on the length than the width and the sooner it gets there the less it will stretch. Bernard.

The trouble seems to be that the stated shrinkage of 3 inches on a yard is caused merely by wetting the pieces in the fulling mill and not by real fulling. All wool is more or less elastic, but some kinds of wool have a tendency to shrink as soon as they come in contact with water or any wet substance.

The fact that the fuller leaves the doors of the fulling mill open would seem to strengthen this opinion. He has evidently found that the pieces full too quickly and to work more slowly opens the doors. I would suggest that he make an experiment and put the marks on the list of the next piece in the usual way, and wash it with water without fulling. I think it will be found to shrink as much as the piece in the fulling mill. To overcome this trouble the pieces will have to be fulled six inches to the yard. The dry finisher should pull the pieces over a steam pipe after each of the different processes. Whatever stretching the goods undergo in the shears and presses the steam will bring them back to the fulled length. South.

---

## Crimps in Worsted Cloths

For some time crimps have appeared on our fabrics. Will you tell us how these are made or how to prevent them? Baker (1204).

Crimps are a fault common to worsted cloths and appear soonest in fabrics of hard make. They form by the cloth being allowed to remain

in creases while hot and wet, as in this state the fabric is very soft and creases quickly. If lifted hot from the dyeing vessel, worsteds often show the form of crimp known as laid crimps or crow's feet. They form by the plaiting down of the hot cloth, the bottom layers always suffering the most owing to the weight of the top ones. Prevention is best done by running cold water into the vessel before lifting, or the cloth may be run through a cooling tank before being piled ready for washing. Tanks for cooling purposes are often let into the ground in front of the cistern used for dyeing; when flush with the floor a pair of substantial hinged lids cover the tank at once, and when not in use the top forms a part of the floor.

Another crimp known as the long vertical crimp is generally caused in the preliminary soap scouring, and sometimes in the washing off after dyeing. The most frequent cause is long running in one fold during scouring, aggravated by hot soap solutions. Scourers' crimps are in 90 per cent. of cases fast and incurable, the crease being in severe cases broken. Hot liquors are great causers of crimps, and no higher temperature should ever be used for worsteds than what can be comfortably borne by the hand. Long running in the same crease is also a fruitful cause of this fault, and in many cases far too much soap is used, with the result of prolonging the scour in order to clear it out. Cold liquors rarely give rise to crimps, unless

the squeezing rollers are exceptionally heavy or the cloth is overcrowded in the washer. With the idea of changing the form of crease, the cloth is often crossed at the back of the machine, so that two pieces instead of running in two endless bands run in the form of a figure eight. Open width scouring machines are recommended for goods with a tendency to crimp; they certainly keep the cloth open but take a long time to perform the work as the squeezing is slight.

Sergius.

---

## Brightening White Blankets

Can you suggest any harmless solution that we could use in washing our country blankets to brighten the white? Could the same solution be used when washing black and white or other plaids? How can we overcome the effects of using muddy water? Syracuse (848).

Probably the water being used is one cause of the dull colors and we would suggest that a clear water be provided, either by filtration or finding a new source.

If the blankets are scoured thoroughly before fulling and washed carefully afterward, the white should be bright, provided suitable stock is used. A good scouring soap is made as follows:

10 ozs. good soap, or
1½ ozs. cotton seed oil soap,
3 ozs. alkali,
1 gallon of water.

This solution should be boiled until dissolved. Just before it is cold add one-half ounce of sal ammoniac to the gallon. If this is added while the solution is hot, the sal ammoniac, being very volatile, will lose much of its value.

After fulling, rinse the goods thoroughly in the washer, but do not add soap. Rinsing should last from 45 minutes to one hour, first using warm water, and then cold, and allowing the suds to drain off frequently. When blacks or other plaids are washed the warm water could not be used unless the color was very good.

---

## Removal of Spots on Worsted Goods

I would like a recipe for removing spots from white worsted goods that are to be piece dyed.
Orinoco (427).

Ordinary dirt spots can generally be removed with soap and water. Rust spots can in most cases be removed by a weak cold solution of oxalic acid. They do not disappear immediately, prolonged treatment being necessary. The solution is applied to the spots and the cloth left to soak, the spotted places being in the meantime repeatedly dampened. Finally the spot is removed by rubbing with a sponge or cloth. It is often a good plan to apply a dilute alkali solution to neutralize the acid that may remain in the goods. If the goods have been dyed and the color has been affected by the acid, the

pieces are passed through a solution of spirits of sal ammoniac. Several thicknesses of cloth should be placed under the piece of cloth that is being treated. If this precaution is neglected and the cloth rests upon wood, stone or other hard substance, the spot is likely to be made larger because of the spreading of the rust. If the fabric is very thick and firm, both sides should be treated.

If there are many spots in the goods it is well to apply the acid solution in the scouring machine. The pieces are run in the solution until the spots disappear, the worst places can be treated by hand as already described. After treating with acid the cloth is thoroughly rinsed in clear water and then in a weak alkali solution.

Spots caused by animal oil are easily removed by benzine, spirits of sal ammoniac or with a solution of acid and ammonia. Delicate colors should be treated with neutral soap only.

Mineral oil spots are removed as follows: After placing the cloth on felt or three or four thicknesses of clean cloth, olive oil, oleine or rape seed oil is applied to the spots and left for some time to soak into the goods and become mixed with the mineral oil in the spots. The spots are then treated with the following solution: 20 per cent. of soap, 60 per cent. spirits sal ammoniac, 20 per cent. acetic ether. They are then rubbed with a sponge or cloth and the goods rinsed in lukewarm water. Washing in a soap solution is sometimes advisable.

Where the pieces are badly spotted oleine is freely applied and the goods are then washed with soap and acid in a regular scouring machine. An old and thoroughly tested means of removing oil spots consists of rubbing the spot with warm oil and then washing with soap and water.

Acid and fruit stains, as well as those made with tar and grease, yield quickly to a solution made of 75 per cent. alcohol, 5 per cent. benzine, and 20 per cent. spirits of sal ammoniac. Fruit spots are readily removed by unterchlorsaures natron.

Mold spots, if only on the surface, are removed by a thorough washing or steaming. If, however, the mold has penetrated the fabric the spot cannot be removed, because either the fibre or the color has been partially destroyed. These mold spots appear in the form of light colored places in the finished goods. Pieces that are spotted with mold should first be treated with spirits of sal ammoniac in the scouring machine, then with a solution of soap. Good results are also obtained with unterchlorsaures natron.

Faint acid spots caused by carbonizing disappear by scouring; pronounced spots remain visible after the goods are colored, in which case it is necessary to dye the pieces black.

Spots caused by pouring strong solutions of alkali on the goods during washing, fulling or neutralizing remain visible even after dyeing, and generally do not yield to any treatment.

In rare cases they may be removed by neutralizing the alkali spots with a weak acid solution, then rinsing the goods in clear water.

Small spots caused by specking ink are removed by a damp sponge; large spots of the same origin are removed by scouring the pieces with soap and fuller's earth in the regular scouring machine. Sometimes such spots can be removed by a rinsing in clear water. Ink spots are removed by unterchlorsaures natron. Spots caused by steaming or sponging are removed by repeated rinsing in warm water or by steam blowing. N. N.

## Sponging Cotton Warp Worsted

We enclose sample cut from a piece which before sponging was in good condition, but after being subjected to the ordinary steam sponging a number of red stripes appeared across the piece at irregular distances. Some of these stripes ran across the piece and some lengthways. Please let us know the cause of this discoloration.
Clifton (1056).

After a careful examination I find that this fabric is composed of cotton warp and worsted filling, and the change in color has taken place wholly in the warp threads, the filling threads not showing any change. I feel quite sure in saying that this cloth was colored in the piece by what is known as the one dip process. The cause of the change of color on the cotton is owing to the high temperature to which it has

been subjected in the steaming or sponging process, the color used in dyeing not being able to resist the action of the steam at this high temperature. If this piece was steamed hard enough the color in the warp would change throughout the whole piece. I would suggest sponging this fabric by the cold process.

Finisher.

---

## Finishing Fancy Cassimeres

I would like the methods used by some of your old finishers on fancy cassimeres. Our selling house is not satisfied with the finish we give them. Holmer (1472).

As cassimeres are close finished fabrics, they should be mended in the grease. All parts are treated alike during the finishing process and this will make the imperfections less likely to show than if the sewing is done after the goods are sheared.

In the next process, fulling, the pieces are folded with the face inside and the selvages sewn together. This makes the pieces full more evenly and also keeps the flocks from the face of the goods, if flocks are used. The flocks should be applied as slowly as possible and the pieces run from fifteen to twenty minutes. The goods are now ready for soaping and for this a soap containing three to seven ounces of alkali per gallon is best. It should be used lukewarm and care taken to have the pieces wet evenly and thoroughly. Good judgment is

necessary to shrink the goods in length and width in the same proportions. If this is not done they will be more likely to draw out or stretch in succeeding operations. It is a good plan in some cases to take the goods out of the fulling mill and reverse the ends during the operation. They should lose anywhere from 18 to 22 per cent. in weight.

After fulling the goods are scoured, but this should be more of a rinsing process than scouring, as the soap used in fulling should have alkali enough to raise the grease thoroughly. After several applications of warm water in the washer, pour on a 2½ per cent. solution of sal soda to remove any soap remaining and then run in cold water for half an hour. If the pieces are to be scoured fill the washer half full of water. For fancy colors add a small quantity of sulphuric acid, run for ten minutes and rinse well in cold water. If the goods are to be burr dyed they should not be scoured. The pieces are now extracted lightly and gigged.

The goods must be gigged very carefully in order to bring the threads out round and full. The next process is back burling, after which the goods are taken to the shear. This operation of shearing should not be hurried and several runs should be made with the blades at different points until the threads show full and round. On the specking table burrs and coarse fancy threads are carefully removed, and any places to be mended should be marked.

After two or three runs on the brush the pieces are pressed. If a screw press is used the pieces should be folded with the face inside and paper placed between the folds. The papers should be changed at the end of six hours and the face of the goods lightly steamed.

With a rotary press give a moderately hard pressure so that the back of the piece will hold the pressing when the face is steamed. Run on the roll, let stand for twenty-four hours, then steam lightly again. After a final inspection the goods are ready to be cased and shipped.

I. A. T.

---

## Rust Spots on White Woolen Goods

We are having trouble in bleaching white woolen goods with sulphur. Small rust spots of various sizes appear at intervals; sometimes they are as large as a man's hand and have the effect of a sponge filled with rusty water and dropped on the goods. The goods are bleached in one long length. Rockland (873).

So many different causes might produce the defect mentioned that it is very difficult to give a satisfactory reply. Possibly the spots are caused in the carbonizing process and do not show up until after the goods are bleached.

A number of years ago I had just such a trouble in the mill where I was working. It was a ramshackle sort of place and all the steam and water pipes were old. One morning rust stains like those "Rockland" describes appeared

on the goods. We looked for the cause of the trouble, but could not find it. For a few days the goods came clear. then the rust spots appeared again. Then we hunted some more, and after a while we found the cause. I had tied a bag over the water pipe before opening it to dilute the acid bath and pieces of rusty iron about as large as peas had lodged near the valve ready to be discharged when the valve was opened. The spots were generally worse on Monday morning after the shut down over Sunday.

Possibly "Rockland" will be able to trace his stains to the same cause. If he is using steam power to keep the bath at a uniform temperature, this may cause it, on account of the affinity of iron for sulphur. If there is a deposit of iron it would be transferred to the goods. We sometimes had to run the water through the pipe for ten or fifteen minutes to clear the pipe of the deposits. Then of course there may be a large percentage of iron in the water, which would make it worse.

It might also be caused by exposed pillars, beams, bolt heads, nails or other iron connections that have corroded and come in contact with the goods during the process of bleaching. The pipes should be covered at once, if exposed. If the trouble occurs early in the week or even early in the morning, it can probably be traced to the pipes. If the water or sulphur used in bleaching contains iron, it would be in such

minute quantities that it could not produce the effect complained of, and in any case it would be more evenly distributed.

Charles Aitkin.

## Bleaching with Permanganate of Potash

I would to have some information regarding the bleaching of union goods, cotton and wool, with permanganate of potash. Stevens (1018)

The bleaching of union goods with permanganate has not been entirely successful for the reason that the cotton contained in the cloth is always very liable to suffer in strength by the influence of the powerful oxidizing action of the permanganate, and also by the action of the acids necessary to complete the bleach.

Wool is quite effectively bleached by permanganate, the strength of solution ranging from ¾-ounce to 2 ounces of permanganate to every 25 gallons of water. One German authority mentions a strength of "4 per cent." which for the above quantity of water would be nearly 133 ounces, and which is no doubt an error, but liable to cause serious trouble to the goods, besides leading to a condemnatory opinion of the process.

With a solution of say, 1 ounce to 25 gallons, there should be added about 1 per cent. of Epsom salts (sulphate of magnesia), the effect of which is to counteract the action of the caustic potash formed in the bath during the deposition of the peroxide of manganese, with the formation of

magnesium hydroxide and potassium sulphate, conserves the strength of the wool fibres. The immersion of the goods lasts about one hour, taking care to have the material thoroughly wetted, then turning regularly for another hour until the peroxide deposited appears to be quite uniform. The actual bleaching is accomplished during the depositing of this brown oxide.

The "clearing" is accomplished by passing the well washed material through a fresh cold bath made up with either bisulphite of soda or sulphurous acid and borax. Some recommend that this bath be heated to 125° F., but to the writer this seems to invite damage to the goods. After the brown coloration has been entirely removed the goods should be removed, well washed to remove every trace of acid, and then dried.

For union goods it is suggested to use a cold permanganate solution of ½ to 25 gallons of water, bleach until the pink color is completely lost, wash well, and give a sour in dilute sulphuric acid at 1° Tw., until the brown has cleared, then lift, and wash well to remove all traces of acid. This will give a basis upon which to work out a process for this type of bleach.

Berwick.

---

## Perforated Rolls for Steaming Cloth

What are the advantages and disadvantages of large and small perforated rolls for steaming cloth? We are now steaming our goods on an

ordinary steam gig with 7-inch rolls, and are informed that better results can be obtained at less cost with the use of a regular steaming machine with larger rolls. Stein (457).

Increasing the size of the rollers enables a larger quantity of cloth to be wound without any increase in the thickness of the cloth through which the steam is forced. Two pieces of 24-ounce worsted serge measuring 79½ yards were wound on a 7-inch roll and the cloth was five inches thick. It would, however, take 152½ yards of the same kind of cloth wound on an 18-inch roll to make a thickness of 5 inches.

Experience has shown that with copper of the ordinary thickness, 1-8 of an inch, it is not safe to increase the diameter of the perforated roll beyond 18 inches. If made larger than that the pressure of the air when the steam is condensed inside the cylinder is liable to cause the cylinder to collapse.

---

## Wrinkling of Woolen Goods

We are making union dress goods and flannels weighing 10 ounces per yard, 56 inches wide, 26 warp threads and 28 picks per inch in the goods. We fold by hand and bolt our goods, using a long table with a hand baling machine. Some of the pieces will bolt even, others will not lie smooth on the table and will wrinkle on the bolt. We dry on tender bars. We use a steam press for finishing part of our goods, but have the trouble with goods that are not pressed at all. Can you suggest a remedy?

Canton (988).

Not knowing the nature of the wrinkles, this is a hard question to answer, but there are several causes for this difficulty. The most frequent is tight listing and cockles. When the trouble is caused from the listing the cloth will bag in the center when the listings are folded together and will wrinkle when the goods are folded up. The only remedy for this trouble is to use as much tension on the press as possible when pressing the goods, that is, stretch them lengthways. This will stretch out the listing to correspond with the center of the piece. This remedy is also used when the listings are loose. The finishing department is not the proper place to remedy this trouble, it should be done before weaving. It is usually caused by using yarns for the listings differing in size from those used in the rest of the warp.

As the goods will not lie smooth on the table, I judge the trouble is caused from cockles. It is often maintained that this trouble is caused in the fulling process, from uneven soaping, etc., but this is not so. Cockles cannot be made in the fulling mill. Cockles are made before the goods reach the finishing department, or even before the goods are woven. As they cannot be seen until brought out by the fulling process it is but natural to lay the blame on that. Cockles are often the result of uneven filling. mixed filling, uneven weaving and uneven oiling of the stock. The latter is the most frequent cause. Weaving in old bobbins of filling that

have been allowed to lie around for a long time will also cause cockles. In such cases the oil is firmly set and is apt to start uneven in the fulling process. This can be overcome by a strong solution of alkali, as strong as the fabric will stand. Alkali is a strong agent in the fulling process and is likely to bring up the goods in width and length before the required amount of felt is produced. In such a case the goods should be thoroughly scoured before fulling, when it will be possible to treat them at this point so that the required finish may be obtained. Cockles are never caused from uneven soaping unless hot soap is used. This should never be used as the soap will penetrate very quickly in spots and these places will begin to full before the drier places become wet enough to start.

Mixed filling in the weave room will often cause bad work, especially on fabrics that require a lot of fulling. The filling being of different stock, with more or less twist, the goods will full unevenly. This is easily detected as the wrinkles run straight across the goods. When the goods come to the finishing room in that condition the only thing to do is to stretch them in width, leaving the pieces on the rolls over night. Vincent.

## Test of Hydro-Extractor

How much water should be left in woolen goods by a centrifugal extractor? Dry Gig (371).

The amount of water in extracted cloth depends upon the fabric and efficiency of the centrifugal extractor. If the fabric is close and solid, it will not absorb moisture as well as will a soft, spongy and loosely woven cloth. The efficiency of a cloth extractor is tested by weighing the pieces as they come from the machine and again after drying. The pieces should not be subjected to any process of finishing between extracting and drying. For example, a piece of kersey weighs 81½ pounds when extracted and 62 pounds when dry, showing that the extractor left in the piece 19½ pounds of water which was removed by drying. This 19½ pounds is 31.4 per cent. of the dry weight of the piece. By making an occasional test of this kind the efficiency of the machine can be determined. The tests should, of course, be made with the same fabric as the amount of water retained by different fabrics varies widely.

Following are the results of tests of an extractor on six pieces of tightly woven kerseys, style 4608, and two pieces of loosely woven beavers, styles 1441 and 1382. The water left by the extractor in the kerseys varied from 25.7 to 37.7 while that left in the beavers varied from 80.1 to 85.7 respectively:

| STYLE | WEIGHT | | | Percentage of water based on dry weight. |
|---|---|---|---|---|
| | Extracted | Dry | Water | |
| 4608 | 81½ | 62 | 19½ | 31.4 |
| 4608 | 63½ | 50½ | 13 | 25.7 |
| 4608 | 65½ | 51½ | 14 | 27.1 |
| 4608 | 73 | 53 | 20 | 37.7 |
| 4608 | 73 | 56 | 17 | 30.3 |
| 4608 | 75½ | 55 | 20½ | 37.3 |
| 1441 | 104½ | 56 | 48 | 85.7 |
| 1382 | 104½ | 58 | 46½ | 80.1 |

The wide variation here disclosed was probably due to the fact that the pieces were run in the extractor for the same length of time irrespective of the fabric, and shows the necessity of gauging the time of running by the class of goods handled. The speed of the extractor is of course limited by the consideration of safety.

## Burr Dye for Wool, Worsted and Union Goods

Will you kindly give me recipes for burr dyes which can safely be used on all-wool goods and on union cassimeres and cotton warp goods. Also please give the strength to be used.

Burry (1314).

Burr dye is made of logwood, blue vitriol and soda ash, a good recipe for it being:

Extract of Logwood.....48 lbs.
Soda Ash .....30 lbs.
Blue Vitriol .....12 lbs.

This should make about 100 gallons of a burr dye that can (properly diluted) be used with safety upon almost any kind of woolen or worsted, excepting cotton mixtures. The dye will stand at about 10°, and has to be diluted with cold water to suit the fabric under operation. This burr dye, as in fact all others, must be used only when perfectly cold; again it will not do to allow the goods to stand still in the liquor any length of time.

Another recipe for a burr dye is given thus:

| | |
|---|---|
| Extract of Logwood | 200 lbs. |
| Soda Ash | 110 lbs. |
| Blue Vitriol | 50 lbs. |

This should make about 200 gallons of a burr dye, and which also has to be reduced with cold water previous to using it.

The extract of logwood as used for burr dye can without disadvantage be of an inferior grade, or hematine will do just as well. This logwood or hematine is put into a tank with sufficient water to fill said tank about 1-8 full. Then add the blue vitriol, turn on steam, and bring the mixture to a boil, after which turn off some of the steam and boil moderately, until all the vitriol has been dissolved; then turn off the steam and let the liquor stand for a few hours to cool, adding at the same time a pail or two of cold water. Then add the soda ash, but remember, very slowly and carefully, since as soon as the soda ash and the vitriol come in

contact, fermentation sets in, and the liquor will begin to boil and rise, and possibly run over in the tank, and thus the best part of the coloring matter be lost.

When all the soda ash has been added, let the liquor stand for some time, in order to give it a chance slowly to work, and at the same time, if at any time there are signs of it rising, add a little cold water. Agitate the ash gently until you can stir the liquor without it showing signs of much rising, then turn on steam and bring it slowly to boil, and in turn keep this up for about four hours. Next turn off the steam and fill tank with cold water, keeping the liquor well stirred while the tank is filling.

When the process is finished, the liquor should possess clearness and richness (a clear plum or claret) of color, when, however, if the color is muddy and of a dirty blue, gray, or black shade, it is a sign that an error in preparing it has been made, and that the dye will give poor results when used. Never combine the coloring matter with the ash first and then add the vitriol, for in this manner the best strength of the extract of logwood is wasted, while if it is combined with the vitriol first and the ash added last, all of its power is retained. Combining the vitriol and ash with water, and then adding extract of logwood, will also give poor results, there being something in the extract of logwood which needs fermentation, and which is omitted by this combination of the ingredients. In the same

manner adding all three ingredients at one time into a barrel or tank, and this to boil with a small amount of water, will also give a poor, if not valueless burr dye.

The more soda ash there is used, the deeper a claret the shade will be, while, if the amount of vitriol used is increased, then the shade will lean more towards the blue cast than the claret.

A point which sometimes puzzles a finisher is just how strong a burr dye should be in order to produce results. This, naturally, varies more or less with the kind of goods treated, that is the character and abundance of specks and burrs which it has to conceal; also upon the method adopted in applying, as well as upon the time when the dye is used. Under ordinary circumstances, and upon a fair grade of stock, the dye will be found to work well at 1½° to 3°. The quantity of dye to be applied to the goods also varies with the amount of work which it has to do, and with the method of its application.

Some finishers use the dye in the washers before gigging the cloth, and when about three pails of the 3° dye to the piece will do the work. The operation in this case is thus: Run the fabrics in the washer sufficiently long to thoroughly start the soap and dirt; and do not add the dye until a good, clean lather has begun to show. Each piece should run in its three pails of dye for at least twenty minutes before the rinsing in cold water has begun.

However, the best plan is to defer the burr dyeing until after the goods are gigged. In this instance, although we may use the same amount of dye,—about the same, viz., three pails to the piece,—yet it is only necessary to have it about half as strong as if burr dyeing in the washer, in order to accomplish the same results, 1½° in most cases being quite strong enough for all practical purposes.

A good method of applying the burr dye to the goods is thus: The dye is contained in a large square tank, a roller frame being adjusted in the tank and on which the cloth is run from a pile on the floor. The cloth is thus run up from the floor and down into the liquor, being passed over the top row of rollers and under the lower row alternately. Then just before it passes out of the tank, it is run between two large squeeze rollers, in order to save the surplus dye liquor, which thus runs back into the tank and is re-used. From these squeeze rollers, the fabric is run on the roller or directly into the washers for the removal of the loose dye and the final cleansing. In its passage between the large pressure rollers the cloth must be carefully smoothed, and not allowed to curl or wrinkle under at the selvages. By this method of burr dyeing, the cloth is not allowed to remain in the dye too long at a time, and the liquor is evenly and uniformly distributed over the whole piece, so that no part of the goods receives more than the

other. Cloudy and shady goods will not be liable to form if care is taken.

In most cases, however, the burr dyeing is done in the washer, in which case let the goods run 20 minutes in the dye, and then rinse well and give a bath of fuller's earth after that, which will prevent all danger of the goods crocking.

## UNION GOODS

When dealing with union cassimeres, and all goods which have cotton warp and wool filling, we must resort to different plans for burr dyeing, or else a different effect will be produced upon the cotton from that produced upon the wool portion of the fabric, for the fact that if the dye were so made that it would produce exactly the desired effect upon the wool and cover nicely all the specks and dyes contained therein, it would be most likely to tinge the cotton in the fabric to such a marked extent as to materially affect the whole appearance of the piece. For such goods a good recipe for preparing burr dye is thus:

| | |
|---|---|
| Extract Logwood | 175 lbs. |
| Soda Ash | 140 lbs. |
| Blue Vitriol | 90 lbs. |

This produces 200 gallons of a dye which stands about at 15°, and which for dark shades should be reduced to 2°, and for light to 1°, while 2½ pails to a 6-4 piece, and from 10 to 15 minutes, application in the washer (consider-

ing a fabric previously gigged), will give proper results. The rinsing after this is a very important step, and must be carefully and thoroughly done, with a good rich flow of pure water, otherwise goods may crack. Plenty of time must always be given for this scouring or rinsing after burr dyeing, since, unless it is well done, this result is inevitable. If it is desired to produce a sort of blue cast on these fabrics, a case often called for, it will be necessary to employ about twice as much blue vitriol and half as much soda ash. But here there will be trouble unless the greatest care is taken not to use too much of the vitriol for the good of the cloth. The amount which can be safely used will depend largely upon the condition of the goods, but under any circumstances enough should be used to cover all the burrs and specks, or else its purpose will have been in vain.

Any batch of burr dye should be always tested before it is used, and, if possible, kept exactly uniform for all similar styles of goods. Again it must be applied in even and regular quantities, and the goods must always be allowed to remain in the dye for the same length of time. The dye is always best in its action when perfectly cold. However, not only must we use a perfectly cold burr dye, but at the same time the goods must be also in a cold state, and to make sure of this, give them about five minutes' run in cold water after putting them in the washer, but be sure and have them

well drained before running them through the burr dye tank, or adding the dye in the washer, provided no special burr dye tank is used. In the latter case never leave water in the washer to thus reduce the dye, for such a procedure will result in uneven work. Always reduce your dye to the exact strength wanted before giving it to the goods.

---

## Dewing Process

I should like to have your opinion of the efficiency of the "dewing" process in the shrinking of woolens. I understand that some of the mills that stamp their goods "London shrunk" are using this method. They suggest giving the goods a light steam sponging before cutting, which we often find not only causes shrinkage but cockles the goods. The results are not as good as with similar fabrics on which the "London shrunk" process has not been used.

Another source of great complaint is the tendency of so many worsted and mercerized fabrics to cockle in the process of steaming. Is there not something in this latter day process of manufacture that is responsible for both the evils herein mentioned? Sponger (970).

The "London shrunk" process consists in dampening the goods heavily, either with a "dewing" machine or by rolling the pieces between the damp leaders. After the cloth absorbs sufficient moisture, the pieces are pressed in a plate press. In this way all stretching of the goods, either widthways or length-

ways is avoided. This process is rather laborious and slow.

In order to obtain a larger production and reduce the cost of labor, a number of mills have adopted a different process which they nevertheless call "London shrunk." Ordinarily it consists in dampening the cloth lightly on a "dewing" machine. The pieces are then run through a rotary press which stretches them lengthways. They are then dampened again lightly on the "dewing" machine and pressed a second time in the rotary, which stretches them still more. This process naturally results in leaving the fabric in such a condition that it will shrink when sponged. The process is wrongly called "London shrunk" and in all probability was used for finishing the goods under examination. Finisher.

---

## Slipping of the Cylinder of a Rotary Press

We are making large quantities of piece dyed beavers and kerseys and have a great deal of difficulty with the press. The cylinder slips on the goods so that the cloth does not pass through the machine, but wrinkles at the edges and sometimes in the center of the pieces. At times the difficulty is so bad that the cloth remains stationary while the cylinder is running. We have repeatedly rusted the cylinder, but this does not seem to be entirely effective. The cloth runs somewhat better after the rusting, but the trouble soon reappears. Can you give us a remedy? Cylinder (162).

From the description given of the trouble by our correspondent, we would judge that the principal cause is gum or dyestuff on the goods, which fills up the surface of the cylinder and reduces the friction to such an extent that the machine cannot carry the goods through. This trouble is very liable to occur with piece dyed goods, where more or less of the dyestuff is left in the fabric. Heavily burr-dyed goods are also very liable to the difficulty. The burr dye is in the form of a loose dye attached mechánically to the goods and easily separated from the fibre. To remedy this difficulty the goods must be cleaned more thoroughly, the surplus dyestuff or dirt being removed; the cylinder should be well rusted. It may be that the cylinder has become so smooth as to necessitate draw filing. To rust the cylinder the press beds can be run back from the cylinder, and the brass jackets can be taken out or they may be protected thoroughly from water and acid by burlap or other means. The ordinary commercial sulphuric acid full strength or muriatic acid half strength should be applied and the cylinder left to stand over night. In the morning the surplus acid is well washed off and examination will determine whether the rust has sufficiently developed. During this operation the cylinder should be cold. With clean goods we do not think our correspondent will then have any difficulty.

## Steaming and Stretching

Kindly explain the process of steaming and stretching or boiling and stretching and the results aimed at. Hooper (1344).

The steaming and stretching machine ordinarily receives the cloth from the extractors, and has for its object to smooth out all wrinkles, prevent lightning effects caused by too long fulling, to sadden the cloth to its natural state, and finally to wind the cloth under operation on to wood rolls ready for the gig or napper as the case may be. For still further improving the lustre and feel of face finished goods before their going to the dryers, as well as to remove wrinkles and creases in cloth that has laid around for a long time, and for steaming and stretching in general, this machine will be especially found of advantage.

The cloth usually is run into the machine from the open fold, and passes first through tension bars, then over the first stretch or expansion roll to the second stretch or expansion roll. Between these two rolls there are several lengths of perforated pipe by which the steam is let onto the cloth as it passes over the fabric, thus receiving the cloth while it is in a perfectly smooth condition, and from where it goes directly to the winding roll. The machine will handle the heaviest or lightest goods equally well, as the tension of the cloth and the hardness of the roll can be regulated. All the run-

ning parts of the machine are gears or sprockets and chain, so there are no belts to be affected by the water or steam. Some of these machines are built to fold the cloth off onto the floor, in place of winding it on a roll, again some have both attachments applied, either one of which can be used as the case may require.

This machine is also built with a boiling pan, so that the cloth runs through boiling water, the latter being boiled by a perforated steam pipe roll, set in the pan, and in which instance the machine is termed a "boiling and stretching machine." Some machines again are built having both attachments (steaming and boiling) added, either one of which may be used. Again the regular steam box can be substituted for the perforated steam pipes, if preferred. Larger machines having three stretch rolls, double the steaming capacity, and a larger brush with two or three cloth contacts are also built.

All worsted fabrics that are to receive a finish that requires gigging should be taken from the washers to the steaming and stretching or boiling and stretching machine and rolled up to give them a smooth face free from wrinkles and pits and streaks. They should remain on the rolls from two to three hours. French.

---

## Waterproofing Woolen Goods

Will you please give us a simple receipt for waterproofing woolen goods? We have no dye

tubs or tanks and want some simple and inexpensive process that does not require much special machinery or expert knowledge of chemistry, as we have no one in our employ with that knowledge. Colorado (637).

There is a new process for waterproofing woolen goods recently brought out which would seem to answer the requirements of our correspondent. The only machine required is a washer and the finish is produced by giving one run in the washer.

The following directions are given by the manufacturers:

Dissolve 80 pounds of Squantum paste in a 50-gallon barrel. Put the paste in barrel and add 20 gallons of water; heat up to boiling and then fill barrel with water and thoroughly mix. This makes a stock liquor sufficient to treat 1,400 yards of medium weight goods.

To run 200 yards of goods: the waterproofing is to be done in washing machine, and the goods should first be wet out in hot water, and only enough water used to cover the goods. While goods are running add 7 gallons of stock liquor from the barrel already prepared, and run in this bath for about one hour, keeping temperature up if convenient to do so. Now fill washer 1-3 to ½ full of cold water and without stopping goods add 8 pounds Squantum liquor and run for five or ten minutes longer. Then extract lightly, dry and press.

The quantity of paste and liquor to be used may be varied according to the nature of the

fabric. Light weight, loosely woven goods will require more than a closely woven fabric.

It takes 2 pounds of the liquor for every 3 pounds of the paste used. The cost figures from 1½ to 2 cents per yard.

---

## Cloth Boards

I wish you would draw the attention of manufacturers to the wretched habit of some of them, who use rough lap boards for cloth. It frequently makes from five to seven yards on the inside of the pieces almost unmerchantable. By using a little more care and properly papering the boards they would save the jobbers no end of annoyance and themselves a lot of claims.

Cloth Examiner (984).

We have frequently called the attention of manufacturers to the damage resulting from this very bad habit. There is no excuse for it. If manufacturers don't want to take the bother of papering the boards they should insist that they get properly finished cloth boards, or they can procure patent cloth boards made of paper and wood which need no covers and which are very much lighter than wood boards and equally strong, or the specially designed paper cloth boards which overcome the objections of our correspondent,

---

## Face Finish

Will you explain for me the secret of producing a good face or lustre finish on broadcloths, beavers, kerseys, and such goods?

Waddell (1463).

In the finishing of broadcloths, kerseys, beavers and goods of similar character, requiring the face or luster finish, it is not infrequently the case that too much is expected of the steamng or boiling process, to the neglect or oversight of the importance of other parts of the work.

The prevailing idea, which is only partly correct, that the steaming produces the luster, is often misleading, and in the case of young finishers who have had little experience on this class of work, tends to lead to imperfect results.

The writer's attention was recently called to two instances of mills on this class of work, where the results were not satisfactory; and the impression on the part of the manager in each case seemed to be that there was some serious fault or deficiency in the steaming of the goods. We took pains to procure samples of the goods, and found that there was a difficulty existing which could never be corrected in the steaming: a difficulty which at once suggested the need of more skill or care in preparing the cloth for steaming. Steaming alone can never develop a luster of any consequence, and the proper preparation and condition of the cloth for steaming is equally important with the steaming itself.

To demonstrate this point we might ask Waddell to take a piece of broadcloth having a good luster finish, and note the difference in the appearance of the face and back. It will

be found that however perfect may be the luster on the face, there will be far less, if any, on the back. If steaming produces a luster, why does not the back show it as well as the face? Simply because the back has not been prepared, by a suitable gigging to bring about such a result.

It is impossible to secure a satisfactory luster upon a cloth having the fibers matted and lying in every direction, as they appear in the felted surface of the cloth as it comes from the fulling mill.

The raising of a suitable nap, and above all a perfect parallelism of all the fibers showing upon the surface of the cloth are as important as the steaming. The luster is a characteristic of the wool fibers, and the gigging and subsequent steaming only tend to put them into a position and condition to show the natural luster to the best advantage, and to insure its permanency upon the face of the cloth.

We found by a careful examination of the samples above referred to, that the gigging had been insufficient. Many of the fibers upon the face of the cloth were still in their felted condition, showing through the scanty nap, which was not sufficient to wholly cover up the tangled fibers beneath. All the visible fibers upon the face of the cloth should have been included in the nap, and properly laid by a wet gigging or brushing preparatory to being given a permanency by the steaming.

The best results are obtainable only by having a nap that will thoroughly cover the felt and threads beneath, and making sure it is well laid before the steaming is done. It is necessary to have a suitable felt from which to produce the required nap, and if this is lacking, the fault is either in the fulling or in the construction of the cloth in the loom. Some finishers use the wire napper for a part of the work, and finish up with the teasels, which is an excellent plan. Where the work is done wholly upon the gig it is best to start the work with old and well worn teasels, as sharp teasels will act too harshly upon the unbroken felted surface of the cloth, tearing out fibers that should remain as a part of the nap.

As the work proceeds sharper teasels should be inserted in order to work effectively through the nap already produced, reaching the bottom and adding to the density of the nap. If the work is done on a double cylinder gig, the cylinders should be run in opposite directions, with a grade of better work in the second than in the first cylinder, until the gigging is near completion, when both cylinders should be run in the same direction to finish. Where a single cylinder gig is employed, reversing the cylinder or the cloth will serve the same purpose as running the two double cylinders opposite.

Goods composed of all wool stock will usually stand and require the raising of about all the fibers constituting the felted face of the cloth;

but care should be observed not to work upon the threads of the cloth to injure them. Sometimes in the finishing of low grade goods, having considerable shoddy, it is advisable to hold off a little, leaving a part of the felt intact, but raising sufficient to cover it well. This gives a certain stability to the cloth and avoids the danger of tender goods. At all events, the nap should be thoroughly laid, and all visible fibers parallel in order for the steaming to do justice to the work. Elmo.

---

## Unclean Goods

We have on hand a large stock of finished cloth which is off shade. The goods do not seem to be gigged or sheared uniformly. Every effort has been made to set the machinery to correct these defects, but we have not been successful. Can you advise where to look for the trouble? Miller (1406).

It is very probable that the cloth is not thoroughly cleaned, and if this is the case it cannot be properly gigged, sheared, or pressed. We were called at one time to a mill to correct some difficulties that the finisher was having in his work, and were told that, as in Miller's case, the goods did not seem to gig or shear uniformly, and that it was almost impossible to get out two pieces of the same style that would shade alike.

When we looked over the work, we found the rolls on the rotary gigs were wound with strips

of cloth along the middle, so as to force the teazles to clear up the goods at that point.

In order to shear the goods, they would run them until the sides were clear, and then with a girl on each side holding a sheet of paper over the cloth at the sides, to avoid shearing more at those points, the blades were lowered so as to shear the middle of the piece, all the time cursing someone for making the cloth with slack sides and selvages.

Every effort the finisher had put forth had been to adjust or readjust his machines in the dry finishing or gig room, without giving a thought to the possibility that the condition of the goods brought about by his own inability had anything to do with the trouble.

I first went to the fulling room and adjusted the strength and body of the soap to suit. Then started a set of pieces and followed them through to see that they received the treatment required. In the meantime we pulled off the extra laggings that had been wound on the gig rolls, while the finisher, who was still "on deck," swore it was a mistake, saying that if the goods would not clear up with the laggings they certainly would not without.

Then we made corrections at the shears, straightening the rest and blades that had been doctored in the vain endeavor to do an impossibility.

When the goods came around they gigged and sheared as true and uniform as one could wish.

The trouble above referred to represented two extremes. First in dirty goods and secondly in ignorance of the requirements in the fulling and scouring. When the wet finishing is skillfully and properly done the rest of the work is easy, otherwise impossible In this case the grease in the goods was never properly started and the fulling could not be uniform nor perfect.

The goods 'worried up" instead of being fulled up, the time for the work thereby lengthened to the injury of the colors; and as some were run a longer and some a shorter time owing to the varying of the imperfect conditions, so the colors were varied in shade and the goods in uniformity of felt and finish.

When coming from the washer they were not clean, except on the sides, where they were more exposed to the action of the soap. For it will be found that, as a rule, dirty goods are the dirtiest in the middle, which explains the conditions in which the goods in question went to the dry finishing room.

After getting the work under way, we found no difficulty in matching the goods or in finishing uniformly. Elmo.

---

## Loom and Finished Weights of Woolen Goods

Can you give me a rule for figuring the shrinkage necessary to give a specified finished weight? Deininger (140 ).

If the loom weight less the shrinkage leaves the desired finished weight, there is nothing for

the finisher to do so far as weight is concerned, but when there is a shortage he must make it up in the fulling mill. On certain grades of goods this weight is obtained by fulling with flocks, but the usual method is to shrink the goods lengthways, as well as in width, and by diminishing the yards increase the weight. A proper method of calculating just how much to shrink the goods in order to obtain a given weight will be best explained by an example.

Let us suppose that we are running on a 20-ounce cassimere. We have carefully weighed the sample ends or pieces in the grease and again when finished, and find that there is a shrinkage in finishing of 20 per cent. Our pieces from the loom show 23 ounces, and we are given to understand that they will come this weight right along; so it is evident that we must make up weight in order to have our goods finish 20 ounces as required, as 23 ounces (loom weight) less 20 per cent. only figure 18.4 ounces.

This difference in weight must be obtained by shrinking the goods in length, and this is accomplished by weighting the trap on the fulling mill, provided with a lever for that purpose. To arrive at the amount to be shrunk to give our weight we figure as follows:

23 oz. (loom weight) less 20 per cent. = 18.4.

18.4 × 36 (inches to a yard) = 662.4.

662.4 ÷ 20 (oz. per yard desired) = 33.12

36 inches — 33.12 = 2.88, or nearly 3 inches per yard to be taken up in length.

Every piece should be figured separately where any variation in loom weights appear, in order to insure exact and uniform finished weights. There should be little variation in loom weights if proper care be taken in the weave room and other departments—not more than half an ounce per yard at most, and if the finisher observes more variation he should draw the attention of the responsible parties to same. While no hard and fast rule can be laid down to cover all kinds of goods, it is usually expedient to allow a little extra take-up over and above that figured on, in order to take care of any stretching the goods may receive in drying, napping and any other process subsequent to fulling. The amount of such stretching can easily be ascertained by careful measurements before and after the processes mentioned. Chas. A. Heddle.

---

## Wrinkles in Worsted Goods

Can you kindly give a reason for the wrinkles and cracks in worsted goods and method of removing same? Salem (1101).

If the goods are laid out properly, reeded so as to come off the loom not too wide, the finisher will be able to bring his goods out of the washers or fulling mills a fair width, say 56 or 57 inches, and have them come from the drying machine at 59 inches, even in cheap goods. Under these conditions there will be no trouble with

cracks and wrinkles. If the goods are not laid out too wide they ought to be free from wrinkles. I would also suggest that a small pot eye be used in the washer. If a large one is used I would advise putting in two pieces in each eye.

Another factor is the soap. Any one using a poor soap cannot bring his goods to a proper width without having poor results and badly wrinkled goods. Conditions are so different in every mill that it is impossible to say what is best until one steps into the mill that is having the trouble and sees for himself. Richmond.

---

## Labor Cost of Finishing

We are looking into the labor cost of finishing kerseys and would appreciate any material you might give us on the subject.

North West (1282).

It goes without saying that a yard of good quality of kerseys cannot be finished at as low a labor cost as a yard of union cassimere, but after all it often happens that a kersey is in reality finished at a less cost for labor than a yard of union cassimere. It depends in a great measure upon the place where the goods are handled. This of course brings the matter down to a question of management and it is in this direction where the difference in the cost must be explained.

As an illustration of this point we will give the result of finishing a yard of medium grade

kersey in two different mills, and in order to arrive at a fair average, a period of six months has been selected. This covers part of the slack season and part of the rush season. In the first mill the account at the end of six months stood thus: Production for first month, 15,243 yds.; second month, 14,348 yds.; third month, 16,252 yds.; fourth month, 17,276 yds.; fifth month, 19,248 yds.; and the sixth month, 18,349 yds.; making a total for the six months of 100,516 yds.

During this time there were employed in the finishing room:

| | |
|---|---|
| 1 overseer, at | $3.00 per day. |
| 1 percher, at | 2.25 per day. |
| 1 shearer, at | 1.75 per day. |
| 1 gigger, at | 1.75 per day. |
| 2 helpers, at $1.25 each | 2.50 per day. |
| 1 fuller, at | 1.50 per day. |
| 1 helper, at | 1.25 per day. |
| 2 men at washer, at $1.25 each | 2.50 per day. |
| 1 man for steaming and wet gigging | 1.50 per day. |
| 1 helper, at | 1.25 per day. |
| 1 dryer tender, at | 1.00 per day. |
| 1 general helper for wet end of room, at | 1.25 per day. |
| 1 boy for brush, at | 1.00 per day. |
| 1 man at press, at | 1.25 per day. |
| 1 man for general work at dry end | 1.25 per day. |

| | |
|---|---|
| 2 burlers and 1 sewer, at $1.00 each | 3.00 per day. |
| 4 speckers, at 75 cents each | 3.00 per day. |
| Total, | $31.00 per day. |

The working period was 26 days for the first month, 27 days the next, 25 days the third, 24 days the fourth, and 26 each for the fifth and sixth months, making in all 154 days at $31.00 per day, a total of $4,774.00 for the finishing of 100,516 yards of cloth, or 4¾ cents per yard. It will be observed that the wages paid the different employees were equal to the average, and the production shows that the help were fairly well employed during the whole time.

At the second mill where the cost per yard was obtained, the conditions were somewhat different, although the goods made were of the same grade and quality and the finishing capacity of the mill in point of number of looms was equal in all respects to the first-named mill. Here was found:

| | |
|---|---|
| 1 overseer, at | $2.75 per day. |
| 2 shear tenders, at $1.50 each | 3.00 per day. |
| 2 fullers, at $1.50 each | 3.00 per day. |
| 2 helpers, at $1.25 each | 2.50 per day. |
| 2 giggers, at $1.50 each | 3.00 per day. |
| 1 helper, at | 1.25 per day. |
| 2 men at steaming, at $1.25 each | 2.50 per day. |
| 2 men around room, at $1.25 each | 2.50 per day. |

| | |
|---|---|
| 2 boys on dryer, at 75 cents each | 1.50 per day. |
| 1 man at extractor, at..... | 1.25 per day. |
| 1 man at brush, at ..... | 1.25 per day. |
| 1 man at press, at ..... | 1.25 per day. |
| 2 men at perch, at $1.25 each .. | 2.50 per day. |
| 1 helper, at ..... | 1.25 per day. |
| 4 burlers, at 75 cents each ..... | 3.00 per day. |
| 2 sewers, at 75 cents each..... | 1.50 per day. |
| 6 speckers, at 75 cents each ... | 4.50 per day. |
| Total, ..... | $38.50 per day. |

The production for six months was 12,350 yds., 12,875 yds., 13,425 yds., 15,280 yds., 14,320 yds., and 13,890 yds., making a total of 82,140 yds. The working time for the six months was 155 days, as follows: 26, 26, 25, 26, 26, 26, thus bringing the cost to $5,967.50. This divided by 82,140 yards gives the cost per yard 7 1-5 cents, nearly.

These two instances of the actual cost for labor furnishes much material for careful study, and to one not conversant with the conditions obtaining in mills it will hardly seem credible that such a difference could exist. Let us, therefore, add a few words by way of explanation. The figures given above are taken from personal experience, and the difference found in the two places cannot wholly be laid at the door of the finishing department. In both places the finishing was kept up to the looms so that in the case of the second named mill the help must have had an easy time of it,

while at the first mill things were on a hustle to keep up with the looms. This shows that the production of the second mill might have been larger and the showing in the labor cost much more favorable.

The second mill could not come up to the standard of the first mill and it is a question if it could have handled the amount of cloth which was put through the first mill with less help. The number of burlers employed in the second mill indicates that the cloth came to them from the looms in a much poorer condition than at the other mill. This indicates that either the preparatory work was sadly neglected or the management were trying to produce an article from inferior stock, thus trying to increase their profits. This turned out as it always will, for it is a pure case of saving at the spigot and wasting at the bung hole. Finisher.

---

## Defects After Sponging Low-Grade Woolens

We have had considerable trouble with cloth similar to the enclosed sample. The fancy threads are tighter than the others and show a drawn effect before sponging. This is even more prominent after the ordinary sponging. and the goods cannot be sold unless this defect is remedied. Can you suggest a remedy?
Finisher (1084).

I find the stock in the fancy thread is different from that in the body of the goods. The former is made from long, coarse wool while

the ground work of the cloth consists of a mixture of cotton, short wool and shoddy. When finished the fancy thread is shorter than the threads of the ground work, consequently the strain comes on these fancy threads causing the difficulty of which "Finisher" complains. I would suggest that "Finisher" wind several yards of cotton warp cloth around the cylinder of the sponging machine so as to retard the force of the steam. The smaller the cylinder the less trouble you will have. The latest sponging machines are all made with small cylinders. After the goods leave the cylinder see that they are tightly wound on the wooden roll and left to cool. The only thorough-going remedy for this trouble is to change the construction of the fabric. Greenwich.

---

## Why Fulled Goods Stretch Lengthwise

Why will fulled goods stretch lengthwise and come back to the same length as when taken from the loom after having been shrunk in length three to four inches per yard?

Titus (1399).

Of course on a piece of woolen goods, say a twill weave, where the yarn is not hard twisted they should full easily under almost any ordinary treatment in the fulling mills. But take a piece with hard twisted yarn and the ends packed closely in the warp and also the filling pounded in hard, and if the finisher uses a heavy soap,

the goods will full so long that the life or vitality of the stock is killed and the fibers lose their hold in the washer. and gig, and stretch back where they started from. This is the result of excessive fulling and the only remedy the finisher has at his command is to thin down the soap, draw down on the springs of the mills and keep the goods warm and free from draughts. The goods will then leave the mills in a strong, healthy condition, the colors bright and the cloth having that nice, moist feeling that the trade likes so well, and strength to resist the strain of the subsequent finishing process without losing any shrinkage the fuller may have gained in the mills.

I once secured a position in a mill making 6-4 union cassimeres. They were having a very serious and at first a puzzling trouble with their fulling. The goods would come along all right for a day or two and then the trouble would appear: the goods would chafe and full so long that when up to width they were so tender that they were practically unmerchantable and so it worked intermittently good and bad, and at first sight, without any apparent reason. The man who ran the mills had been discharged and the next man had started out with no better success.

I set myself to find the trouble and was able to do so, luckily, on its first appearance. The mills were ranged with the back against a stone wall, having no doors or windows, while the front

was opposite a row of windows and doors thickly set in a wooden shed built onto the main building. The windows and doors were not close fitting. Now here was the cause of the trouble—when the wind was blowing against the stone wall everything was all right, but when it veered around so as to blow in at the windows and doors the trouble began. The finisher was doing his speck dyeing in the mills and insisted on the fuller keeping the front doors open. The cold air from the windows and doors striking the goods, chilled them so that they were too long in shrinking and gained no felt, and when up to width were the most tender goods I have ever seen and stretched back almost to loom measurement in width. I overcame this by having the fuller keep the front doors closed and open the back doors.

The object of the finisher in ordering the doors kept open was to prevent too many shades. Where speck dyeing is done in the mills, a few degrees of heat makes another shade.

I may say I worked there three and one-half years and never saw another tender piece.

I remember a case where I was fulling all-wool overcoatings, a loose weave to be shrunk eight inches to the yard in length; the goods would shrink so quickly widthways that I could not get the desired shrinkage in length by the time the goods were up in width, so I had to open the doors and covers of the mills, also

open the windows and doors of the room and pile all the weights on the traps that the mill would carry. Of course so much weight on the traps kept the goods warm, but the trouble was really in the lay-out of the goods: they should have been reeded wider in the loom.

Another cause for goods stretching in length is sometimes due to the methods of the fuller. If he has to shrink the goods only three or four inches to the yard in length he starts in to full the width first and gets the goods up to, say, 58 inches, then he begins to shrink the length and may have to use a weight to do it by the time the goods are up to 56 inches, the desired width. Now the fibers being knitted one way before the trap is put on to shrink the length they will not have so strong a hold as if the fulling width and length had been started together from the first, and when the tension of the other finishing machinery is brought to bear on them they invariably stretch. I should think that one-half to one inch ought to be enough to allow for stretch, but this is easily determined by making a test of one set of pieces.

H. B. F.

---

## Watermarks on Worsteds

How is a watered effect caused on the face of worsted goods? On some classes of goods this fault is more prominent than on others where practically the same treatment is given.

Evans (1322)

In winding the fabric on a crab roller the back of the cloth is in contact with the face from end to end. The result of this sometimes is the fault known as watering, where the design of the back has been embossed on the face, showing a peculiar wavy effect. This fault is only visible when a large area of the cloth is seen at one time, for instance, over the rails of a perch or coming over a steaming mill, and can rarely be seen in a made up garment.

Very hard and prominent designs water quickly. Some designs cannot be crabbed at all owing to their susceptibility for developing this fault, and others will only stand the slackest of tensions. Twills and fancy designs generally are not so sensitive to watering as the closer made fabrics, and they are also much less liable to crimp.

Concerning the cure for watering there is only one way to remove it and that will not answer in severe cases. The remedy is to disturb the design slightly by a good soap scouring. This causes a shrinkage, and the fibers being moved a little obliterates the embossing. Sergius.

---

## Streaks in Woolen Goods

We are troubled by streaks and creases in our woolens and half woolens and would like a preventative as we understand it is practically impossible to remedy them. Stallings (1298).

Streaks may be caused before or after the fabric reaches the finishing room, they may be caused during dressing the warp or the weaving, or during one of the various finishing processes. The matter of irregularities in tension when the warps are dressed may cause such a variation in the face of the cloth that in turn the fulling mill may produce streaks; however, this sort of streakiness will not appear prominently unless we deal with a double and twist yarn, light and dark colors twisted together, etc. There the variation will be more apt to cause a change in shade, whereas in connection with a solid color or on an ordinary yarn, no variation would be noticed. If a yarn has any tendency to be unevenly twisted, or to be heavy and light in places, there is the same liability to streakiness when such a yarn gets into the warp.

However, the chief cause of streaks is the fulling mill. In connection with this machine, the warp constituting the cloth, the flocks, or the operation of fulling as carried on, may be the cause of the streaks. For example, if the soap is poured out of a spout on the goods, and if in turn we deal with fabrics which require only little fulling, this pouring out of the soap may have a tendency to result in streaks during the felting of the fabric.

If the goods are allowed to run in folds and remain there during the fulling operation, and if the latter is quick, everything is favorable towards the production of streaks. If fabrics

require flocking a streaky appearance may result in the cloth, from the fact that the flocks will act mainly along the line of soaping.

In connection with the fabrics requiring little fulling, it will be advisable to alter the position of the cloth in the fulling mills, from time to time, in order to avoid chances for streaks.

One of the most frequent causes of this trouble is the bunching of the goods lengthwise in set folds or creases, which are not moved or straightened out until it is too late to do away with them. In order to remedy any tendency towards streaks, soap must be applied uniformly, flocks in the same way put on over the whole fabric evenly, and whenever possible, the cloth should be frequently opened by the operative, so it has no tendency to run in continual folds.

We now come to the washer, and where a defect in the operation of this machine will frequently lead to streakiness of the cloth under operation. Bad or worn out guide eyes for the cloth to go through, bad or worn out rollers, etc., will tend toward possible streaks and are items which must be carefully watched and remedied. It will be frequently noticed how the dirty soap suds roll back upon the goods as they pass over the rollers, and these long streaks of dirty water and suds must leave an appearance of streakiness to the fabric if the whole is not thoroughly removed in the rinsing. Here, as well as in many other processes, a

great cause of streaks lies in defective seams at the sewing together of the ends of the pieces. A bunchy seam will always tend to form streaks not only at the ends of the piece, but even, at times, far into the goods. They must be avoided at all stages.

With reference to the process of gigging and steaming, the tension on the fabric under operation calls for care, since if the fabric is not uniformly stretched, if not handled with a uniform tension, or if the rollers are worn out, etc., streaks are apt to appear.

Care must also be bestowed on the shear, the brushes must be all right, and if worn must either be clipped down or renewed. The brushes on the shear and press frequently are at the bottom of forming streaks in the fabrics, and for which reason an economy in using them as long as possible, instead of replacing them by good ones, will be a false one. A. M. M.

---

## Machinery Required in a Blanket Mill

What machinery and help would be required to finish 300 pairs of 4-pound blankets per day, after leaving the looms? Craig (1087).

"Craig" does not state whether he is making a wool or cotton blanket. If the material is wool, or cotton and wool mixed the following finishing machinery would be needed: One fulling mill, one washer, one wire napper, one teasel gig for gigging the blankets after they

have left the wire napper, one whipping machine. The following help will be needed in the finishing room: One man for the fulling and washing machines, a man and a boy or two boys for the napping machine; two young men for the drier, one woman to run the whipping machine and one man for the folding and packing.

Greenwich.

---

## Scouring and Fulling Cotton Worsteds

Kindly give me the kind and quantity of soap to be used in scouring and fulling cotton worsteds of delicate colors. Ford (1328).

In order to get a fair idea of what kind of soap to make for use in connection with these cotton worsteds, it will be well to investigate the constituents of soap, for what we may find in it that will attack delicate colors by either bleeding them (rub-off), changing their shade, etc. This we will find to be either alkali or free caustic. The latter, if present in any quantity at all, is apt to make trouble for the finisher, for which reason a perfectly neutral soap should be used, and which will meet our requirements in every particular.

Soaps for scouring and milling should be quite free from uncombined caustic alkali, but may with advantage contain a small amount say 0.2 to 0.3 per cent. of free carbonate. They should not contain resin, and are preferably made from tallow, palm oil and olive oil.

The presence of free caustic alkali in soap may be recognized by drying a small sample and then extracting with alcohol, which dissolves the soap and caustic alkali, but does not dissolve any carbonated alkali which may be present. The presence of caustic alkali is therefore readily detected in the solution by the production of a pink color on adding phenol phthalein.

Free caustic alkali, if present, may be neutralized by adding the necessary amount of free oleic acid.

Resin may be detected by decomposing the soap with the acid, dissolving the free fatty and resinous acids in acetic anhydride, and adding sulphuric acid, 100 degrees Tw., when, if resin is present, a reddish violet coloration will be produced.

The body of the soap should first be considered, as this has a very important bearing upon its usefulness, and also from the point of economy, since a soap which will not hold its body, for any length of time, i. e. turn, will be expensive at any cost.

In connection with either fulling or scourng these cotton worsteds we must carefully avoid any tendency for them to felt during these processes, and as the body of the soap is closely connected with the felting capacity of the wool fabric it will be readily understood that it is most important for the finisher to look carefully after this item. The heavier the soap the more

its felting capacity, and therefore, it is important that soap for cotton worsteds is made as light as possible, consistent with good work, since in connection with the construction of these fabrics, the filling, and possibly only a very small amount of the warp is wool, i. e., has felting properties, the rest being cotton, and this small amount of wool has got to be brought out clear. From 1½ to 2 ozs. of soap to the gallon will as a rule be found sufficient, the proper amount depending largely upon the kind of soap we have to use. In connection with a good palm oil soap, or a tallow soap, having possibly enough body-making quality in it, perhaps 1 oz. will be sufficient to the gallon; however, cheaper grades of soap, like cottonseed oil soap, or other grease soap of less consistency than palm oil or tallow, will make the use of 1½ or perhaps 2 ozs. per gallon necessary. Percentages quoted, however, must not be considered as a fast rule, the proper strength to use being best determined by actual trial, for the soap to be used in connection with these fabrics should never be stiff, like common soft soap, when perfectly cold, but should be liquid. Adding from 1½ to 2 lbs. of sal ammoniac to every 50 gallons of such a scouring soap will be found of value, both as to its body as well as to its cleansing power.

Another important item to be determined by the finisher is the proper amount of alkali to put in the soap. This we will always find a

most difficult task for any finisher in connection with a new style of fabrics, i. e., a range of goods constructed on an entirely different basis than he has ever dealt with. Cotton yarn colored, is seldom fast to any large quantities of alkali, except if dyed with such colors as are known and sold as "Fast to milling," and it is for this reason important to use alkali sparingly, sal-soda being well suited. Although the quantity of it to be used may seem large, compared with soda ash or ammoniated alkali, yet by actual test it will be found that even a greater strength of it may be used with less danger to the colors of the fabric bleeding.

Sal-soda certainly is the better product to use on delicate colors, but if alkali is necessary, 1½ ozs. should be amply sufficient, whereas 6 ozs. of sal soda to the gallon may be required. Dissolve the soap first and then add alkali and boil mixture at least for two hours, then fill up tank with water, and allow soap to become cold, after which add the sal ammoniac. Never use warm soap or even warm water on cotton worsteds with delicate colors, provided you don't want them to run or rub off.

When with soap thus prepared, it should be found during scouring that the goods do not lather properly, it will show that the soap is not taking hold freely, and that therefore it will have to be made stronger; this, however, will not often be the case. As soon as the lather becomes dirty, it had best be drawn off

and fresh soap applied, thus preventing the staining of any colors in the fabric structure. Handling cotton worsteds cold will also prevent any colors from bleeding or getting stained; however, in this case it is well and safe to add another pail of soap to each piece, and let them run five or ten minutes extra, when the gates may be opened and the water turned on for the rinsing. After rinsing the pieces for about one-half hour, shut off the water and drain the goods for a few minutes, then shut gates of the washer, and give each piece two pailfuls of salt water made by dissolving a peck of rock salt in a barrel of water. Allow the goods to run in this liquor for about five minutes, and then take them out without opening the gates, and hydro-extract, and dry them as soon as possible thus preventing the colors from running, and thus be the cause of cloudy fabrics. Provided you ever meet with cotton worsteds, which will not stand this procedure, then the use of fuller's earth in place of soap is the remedy. M. D.

---

## Bleaching Woolen Blankets

We cannot keep the rust spots from our white woolen blankets. The goods are bleached with sulphur, and the trouble occurs more frequently in winter, and on the cotton warp goods. Can you suggest a remedy? What other methods of bleaching wool are used besides the old sulphur process? Brimstone (78).

Rust spots are liable to be caused by presence of iron in bleaching with sulphur. Iron such as nail heads, etc., exposed in the bleach house, might cause the trouble which "Brimstone" complains of. If the presence of iron is thoroughly excluded during the bleaching process, we are inclined to think that spots will not appear.

In addition to bleaching with sulphur, wool may be bleached by means of a solution of sulphurous acid, or bisulphite of soda. The wool is steeped for about 20 hours in a strong solution of sulphurous acid, then extracted and washed. For bleaching with bisulphite of soda, the scoured wool is steeped for about 12 hours in a solution of bisulphite, at 32 degrees Tw. The wool is then extracted and treated in a 6 per cent. sulphuric acid bath. During recent years, peroxide of sodium has been employed with most excellent results for bleaching wool.

---

## Determining Shrinkage in Fulling

How do you determine the shrinkage in fulling in inches per yard? Strafford (889).

The average shrinkage of a woolen fabric in finishing should be determined as nearly as possible when the fabric is laid out. It is a detail of construction which in connection with the weight per yard from the loom and loss of total weight in finishing determines the weight of the finished cloth per yard. The shrinkage

in length and width has much effect on the appearance of the finished fabric, and this is an additional reason why it should be decided upon before the goods are manufactured.

The question as to how much a woven cloth should be shrunk in length in finishing to weigh a given number of ounces per yard depends on the percentage of loss of the total weight in finishing and on the weight per yard from the loom. The loss of weight in finishing varies widely with the stock in the goods and the method of finishing. Worsted cloth made from yarn containing but little oil or other foreign substances may lose not more than 5 per cent. or even less, while the loss in the case of kerseys or beavers made from oily, dirty stock, sometimes reaches 25 per cent. or more.

The following example will illustrate the method of calculation. The first piece of a particular fabric before finishing measured 45 yards and weighed 26 ounces per yard from the loom. When finished it measured 40 yards and weighed 23 4-10 ounces per yard. What is the percentage of total loss of weight in finishing, and how should the shrinkage of woven pieces be regulated that vary in weight per yard from the trial piece, in order to bring the finished pieces to weigh 23 4-10 ounces per yard?

The total weight of the woven piece was (45×26) 1170 ounces. The total weight of the finished piece was (40×23 4-10) 936 ounces. Hence the loss in finishing was (1170 — 936)

234 ounces, or twenty per cent. of the woven weight.

The proper shrinkage of pieces for different woven weights per yard is more easily calculated by assuming a woven length of 100 yards. For example: How much should a piece of the same fabric weighing 25½ ounces per woven yard be shrunk to weigh 23 4-10 ounces per yard?

$100 \times 25\frac{1}{2} = 2550$ ounces, weight of woven piece.

2550 — 510 (20 per cent. loss) = 2040 ounces, weight of finished piece.

2040 ÷ 23 4-10 = 87 2-10 yards finished.

100 — 87 2-10 = 12 8-10 per cent. shrinkage in length for woven goods weighing 25½ ounces per yard woven to give a weight of 23 4-10 ounces per finished yard.

The equivalents of the different percentages in inches per yard are readily calculated. Taking the example just given, one yard equals (36 inches × 12 8-10) 4 6-10 inches per yard as the equivalent of 12 8-10 per cent.

These equivalents of the different percentages in inches per yard are needed by the fuller as the progress of the shrinkage in fulling is regulated at the fulling mill by placing two strings one or more yards apart on the selvage and noting the variation of this space from time to time during the fulling operations.

By the method already given the shrinkage for any woven weight per yard is calculated and a table constructed for the fuller. Taking the present example with a loss of total weight of

20 per cent. and a desired finish weight of 23 4-10 ounces per yard, the table would be as follows:

| Ounces per woven yard. | Shrinkage in length Per cent. | Per yard. |
|---|---|---|
| 27 | 7 7-10 | 2¾ |
| 26 8-10 | 8 4-10 | 3 |
| 26 6-10 | 9 1-10 | 3¼ |
| 26 4-10 | 9 7-10 | 3½ |
| 26 2-10 | 10 4-10 | 3¾ |
| 26 | 11 1-10 | 4 |
| 25 8-10 | 11 8-10 | 4¼ |
| 25 6-10 | 12 5-10 | 4½ |
| 25 4-10 | 13 2-10 | 4¾ |
| 25 2-10 | 13 9-10 | 5 |
| 25 | 14 6-10 | 5¼ |

A variation of 7 7-10 per cent. for 27 ounces to 14 6-10 per cent. for 25-ounce flannels is too wide to give good results in finishing, consequently it is better when the woven weight per yard varies as much as this to vary the shrinkage less and get a more uniform felt on the goods, although this may result in greater variation in the finished weight per yard.

When the goods are flocked variations in the woven weights per yard can, within a limited range, be equalized in the finished cloth by varying the quantity of flocks applied to the goods.

Much better results are secured by keeping the variations in the woven weights per yard within narrow limits, thus avoiding any necessity for wide variations in the flocks or shrinkage in

length. A clear understanding of the methods of calculation just given will enable one to compile a fulling table suitable for any grade of goods.

## Clothing on Nappers

How is it that the clothing at the sides of a napping machine wears out at a different rate from that in the centre? I find that sometimes the cards get sharper at the ends than at the middle and other times the reverse is the case. Are the brushes at fault in this matter?

Wolfe (694).

The trouble mentioned in this query arises from the fact that the cloth hugs tighter in the centre than at the sides. This is true of any class of goods. As a result the clothing in the centre of the machine does the most work and consequently gets duller more rapidly. The brushes should be set just close enough to clear the workers. Henry Maine.

This difficulty may be overcome by keeping the cloth at the proper tension and not allowing it to sag on the sides nor in the centre. If it is allowed to sag the brush will wear more on the sides than in the centre. The brush should be kept level at all times. Baker.

## Hard Water in Finishing

It is impossible for me to get the results out here that I used to get in Massachusetts mills. With the same machinery and the same method

my soap bills are greater and the cloth is not right. I have decided there is a difference between the water in Eastern and Western mills and wish you would give me a simple test and advise how to proceed. Milan (1421).

The effect of the lime or magnesia salts in the water upon soap is well known. The latter decomposes almost instantaneously by its contact with these substances and forms a lime or magnesia soap, a product injurious in every way to the wool. Soap plays a two-fold part in the fulling process; first, as detergent, that is, for loosening the dirt and oil, as well as for keeping open the serratures of the fibre, by which at the same time the felting process is promoted; and, secondly, as a protection of the fibre against friction and heat, the latter especially making it rough and brittle. In the former case the action is produced by the alkali with its cleansing effect; in the latter, by the fat, which keeps the fibre soft and pliable.

The cloth fulled with hard water will, as experience shows, run dry oftener, part with fibres more freely than it should, and require frequent additions of lye. Besides this, the lime soap precipitated upon the fibre cannot entirely be removed in spite of washing, making the cloth hard and slippery in feel.

If, in place of soap lye, water is occasionally poured in towards the end of the fulling process, because too much soap has already been added, the evil becomes still greater. Economy is

never more dangerous than in just such a case. By fulling with hard water a much larger quantity of soap is needed, and the more it is stinted the harder and rougher becomes the cloth. Besides this, the more neutral and rich in fat is the soap, the more injurious will be the effect of hard water upon it, while soap of a more basic character decomposes less easily. The difference in the qualities of water explains why it is that a good fulling soap does not act at all times with the same good effect.

Provided hard water is the only one at your disposal, it should be first softened by the addition of a strong solution of granulated carbonate of soda, the amount required to be added depending on the hardness of the water.

A chemist determines the degree of hardness of water by the amount of soap the water will destroy. An alcoholic solution of soap is dropped carefully into a measured amount of distilled water containing a known amount of a lime salt. The value of a cubic centimeter being determined, the soap solution is dropped from the graduated tube into a measured amount of the water to be tested, and when a permanent lather is produced by shaking, the amount of soap-solution is noted and the hardness of the water calculated.

One grain of granulated carbonate of soda will precipitate about one and a half grains of sulphate of lime (soluble in water) as carbonate of lime (insoluble in water). Nearly all water

contains some lime, and may have as much as fifty grains to the gallon. It is therefore necessary to experiment with the water to be used, and discover the amount of granulated carbonate of soda required to precipitate the dissolved salts of lime and magnesia.

To test for the presence of lime and magnesia, fill a clean tumbler with hot water and add a few drops of a strong solution of granulated carbonate of soda. A milky appearance followed by a white precipitate shows their presence.

If water contains five grains of lime and magnesia to the gallon, every 1,000 gallons will destroy over ten pounds of neutral soap; and if 10,000 gallons are used in a day, 100 pounds of soap will have been used to kill the mineral salts, when five and a quarter pounds of granulated carbonate of soda would have done the same work and with no dangerous scum. Once the scum is formed, no amount of soap, granulated carbonate soda, or lye will get rid of it again. The precipitate of the carbonates of lime and magnesia will settle to the bottom of the vat. Have a large tank of known capacity provided with a steam pipe to bring the water to a boil, add the proper amount of granulated carbonate soda necessary to precipitate the lime and magnesia, and allow to settle. Draw from the tank several inches above the bottom, for the supply to make up the soap-liquor, and for washing and rinsing. H. C.

## London Shrunk

Will you give me some information regarding the process of shrinkage known as "London shrunk?" P. A. Scoag (720).

The recognized procedure is to fold dry cloth between upper and lower layers of wet cloth, to dry the cloth by natural means and subsequently to give cold hydraulic pressure. Some minor variations are made. A closely woven cloth which has been well fulled and shrunk at the mills and comes bone-dry from the hot press is not treated with much moisture. Its enclosing wrappers are not so damp that they do much more than supply the normal regain of 12½ per cent. of moisture that dry wool naturally absorbs. Such a piece is encouraged to shrink but little in width and length. The chief purpose is to be rid of the glaze and the harshness and to substitute a pure, soft handle and a somewhat deader appearance.

To suit some fabrics and some customers, the shrinkers find it necessary to use hot pressing at times. It is certainly the case that the exact procedure is not stereotyped, even at any one shrinker's works. Some fabrics are given a more thorough wetting and are dried by circulation in a specially ventilated chamber. One shrinker is said to replace the use of water by low-pressure steam. When it happens that goods in no need of shrinking are sent, it is rumored that the shrinker's stamp and tickets

are placed on pieces that have merely been opened out and cramped in a cold press. But merchants are able, by comparing the dimensions before and after, to see how much the process has done to fill up the cloths. Sometimes the loss of length and width is considerable and at other times quite slight.

The average charge for London shrinking is one penny per yard of 6-4 width or, more precisely, $2.16 per 100 yards. The process has its undoubted uses, though in some quarters it is exalted as a fetish. James Strand.

---

## Wet Finishing Worsteds

I would like a short outline of the processes of scouring and wet finishing worsteds, including piece dyes and goods woven colored.

Murray (1312).

It is important that during the scouring process all foreign ingredients added to the wool fibre to aid spinning, etc., be removed; this should be done thoroughly, as otherwise the colors will lack their proper brightness. Soap certainly is the most important agent in this operation, the body of which must be as light as possible, and the alkali so weak that it cannot affect the colors, yet strong enough to start and then remove the dirt and grease in the cloth.

The following example will give a fair idea of the process: Put sufficient soap on the strings

of fabrics to be scoured to thoroughly wet them and run them in this way for about twenty minutes; then thin down with a little lukewarm water, and run for five minutes, after which rinse completely. To give the goods previous to this final rinse a fuller's earth solution at the rate of a bucketful to four pieces, and to run them in it for fifteen minutes will benefit them considerable. It will be a good plan to strain the fuller's earth solution before using it.

Provided the colors in the goods are found to be dull, a bath of acetic acid given them will brighten them up. Afterwards rinse them well and give a strong bath of common salt. Washing worsteds in the open width is considered superior to the rope method, the cloth coming out of the scouring process cleaner and this in less time than by the rope method, besides a softer feel will be the result, a feature which certainly is an advantage. Again the forming of creases is avoided, certainly another advantage.

In connection with piece dyes, a fabric not properly scoured will make trouble at the dyeing, neither will the fine lustre, so important in the sale of certain goods come up to its standard.

The purpose of this wet finishing process is to limit the shrinkage or felting capacity of the wool fibers in the fabric as much as possible, and at the same time lay the filling in its proper

position in the texture. This prevents in a measure the subsequent shrinkage of the fabric, more particularly in its width, and also its drawing out of shape in the succeeding operations of scouring and dyeing. This process of wet finishing is based on the fact that the wool fibre becomes fixed by the heat, humidity and pressure, and the wet finishing machine enables the finisher to obtain this result.

Worsteds differ essentially with reference to their finishing operations from woolen cloth. With the latter, the aim of the finisher is to preserve the vitality, or shrinking capacity of the fibres, as long as possible, while in connection with worsteds, all finishing operations are designed with the point in view to eliminate these natural tendencies of the wool fibre from the very start.

This wet finishing machine consists of a series of four tanks, of which the first three, as a rule, contain hot water, and the last tank cold water, each tank being equipped with guide rollers, stretching rollers, and squeeze rollers, for guiding, opening the fabric to its full width, and squeezing it. The wool fibre thus softened in the boiling water in the first three tanks, and cooled evenly and thoroughly in the last tank, retains its form in that position much more readily in the cloth structure, losing at the same time its felting capacity. Again all four tanks of the machine may contain hot water, the goods then, after leaving the machine, being

rolled up and left to cool while on the rolls, the fibres in this manner retaining their position (they being set we might say) more thoroughly than if treated as before explained, they losing in the latter instance all tendencies for a further shrinking.

This machine by means of its most thorough construction, treats the goods evenly all over, every inch getting exactly the same treatment. the boiling water and the squeeze rollers tend to free the goods from soap, provided the goods were fulled any, or from other foreign matter, like size, starch, oil, dirt, dyestuffs, etc. The chances for water marks, washer wrinkles and cloudiness, are by the use of this machine reduced to a minimum. If preferred, the machine may also be used after dyeing.

A deep lustre, with a soft agreeable handle is thus obtained, which is all that can be desired. Careful drying follows. Hayden.

---

## Moisture in Drying Rooms

Please give me some information regarding the latest and best methods of reducing moisture in drying rooms. Suncook (1022).

Moisture is removed from drying rooms by carrying the moist air out and introducing dry air in its place by means of ventilating fans of various types. Various methods of removing the moisture by condensing it in order to save the heat in the air have been tried but have proved unsuccessful.

## Steaming Woolens and Worsteds

Why are goods steamed after finishing and how is the work done properly?

Grimshaw (1347).

Steaming, in connection with pressing, by means of the hydraulic as well as the rotary press, is done for two reasons; it removes the gloss on the fibres left by the heat and pressure, and at the same time takes away the harsh, hard feeling, given by this pressing process to the cloth. During pressing, every fibre in the fabric is simultaneously heated and pressed, in consequence of which they lose portions of their moisture and at the same time shrink in themselves and thus to a certain extent become glossy, hard and harsh, a feature not desirable in connection with a great many finishes. Steaming, either alone or in connection with a light brushing, will remove the glaze, and at the same time impart a softer feel to the fabric thus treated after pressing, for the reason that the dampening action of steaming swells the fibres back to their condition before pressing. Care must be exercised not to overdo the matter, nor too little, since in the latter instance the object aimed at is not obtained, whereas too much steaming will take hold not only of the fibre, but of the structure, i. e., finish of the cloth, at the same time, thus impairing the latter. The proper process requires such a quantity of steam as will just remove the glaze without softening too much the finish.

For perfect steaming, allow the cloth to thoroughly cool down from the pressing process, since a highly heated fibre will not only to a considerable extent counteract the influence of the moist steam but at the same time give rise to the formation of electricity, a feature preventing a uniform and even finish to the fabric thus treated and which in turn in some instances may ruin the finish of the fabric entirely. For this reason be sure to allow the pressed fabric to cool thoroughly so that the finish becomes set or fixed before subjecting it to steaming, i. e., that the fibres, which the hydraulic or rotary press has made to assume new and unnatural positions throughout the body, as well as the face of the fabric, must have a chance to get sufficiently set, so that they will retain their new positions, and will not be influenced by the after steaming.

The steaming may be done by means of what is known as a steam box, the characteristics of which are a uniform steam distribution, resulting in absolute even steaming. The cloth in its passage over the box rests on the two application rolls, the shafts of which rest in journals, which in turn can be raised by means of suitable set screws, thus regulating the application of the cloth on the felt cover of the box. The ingenious construction of the box compels the steam to enter the lower and in turn the upper chamber, in such a round-about way as to result in a uniform escape of it, all over the surface of the top of the box.

When starting to operate the box, open the drip valve, enter steam and wait until the latter issues through the felt cover, and then start the cloth. After the box is thoroughly heated, close the drip valve. Leave the latter open any time the box is not in use.

This steam box, besides used independently as a machine, is also frequently found applied to other finishing machinery, viz.: in connection with a brushing machine, and then the combination machine is known as a steam brush; in connection with a stretching machine, and the combination machine is then known as a steaming and stretching machine. It is also applied to pumicing, polishing and sanding machines. N. B. Y.

---

## Cotton Warp Meltons

For years we have been manufacturing cotton warp meltons, which have acquired a high reputation in the market by reason of the well-covered face. Some time ago the mill in which these goods had been made was destroyed by fire; since then it has been rebuilt and equipped with new machinery throughout. We now find it impossible to make as good meltons in the new mill as in the old; the face looks teethy and our customers decline to accept the goods. The new cloth is made of the same kind of stock, the only change in the manufacture being in the looms on which they are woven. The old looms ran 60 and the new looms 90 picks per minute. Can you suggest a cause for our difficulties? Walnut (352).

To obtain a well-covered face on a melton it is necessary to "burst" the threads in fulling, that is to say, to felt the goods so that the threads will be matted so firmly together as to form practically one solid mass. This is more easily effected when the threads are twisted soft. Much softer filling can be run on a loom running 60 picks than on one running 90 picks per minute, and we should not be surprised if Walnut would find upon investigation that the spinner had found it necessary to twist the filling harder in order to make it weave on the fast running looms. This would prevent the "bursting" of the threads in finishing and would cause the teethy appearance complained of.

---

## Rolling of Goods on Finishing Machines

I would like to have you advise me as to the cause and remedy for the rolling of our goods in the washing and dyeing machines. I enclose sample of the fabrics, which are broadcloths weighing 8½ ounces; shrinkage, 7 per cent. in length; fulled from 68 to 50 inches in width. The warp is right twist, filling left twist, 38 picks per inch. We also make worsted broadcloths having 3,600 ends, 54 picks and woven 70 inches wide in the loom, finished 54 inches with a mohair listing. We are having trouble with all of these goods. but only at intervals. Sometimes they will go all right and then suddenly begin rolling to the size of your arm. The filling is steamed three minutes. The listing is woven with two threads in an eye.

Guide Eye (990).

The rolling of these goods is caused by the listing threads not being sufficiently stayed or spread wide enough apart to give them room to lie in proper position during the process of fulling, which on this class of goods is continued to some extent in both the scouring and dyeing processes after they leave the fulling mills. When the goods begin to roll from this cause it is impossible to remedy the difficulty in any of the latter processes. They will be in bad condition, especially after dyeing, as the rolling with its accumulated felt will prevent the penetration of the dye liquor. The reason for this trouble only appearing at intervals, is that the weaver will at times carelessly and improperly draw more than the prescribed number of listing threads through the single eye. The overseer of weaving should be made acquainted with these facts and have the loom fixers and weavers instructed to guard against this mistake.

Rigo.

I have been having the same difficulty with my goods that "Guide Eye" complains of and found the following to be of much service: Be sure and soap evenly in the fulling. Tack the pieces before fulling as close to the edge as possible, leaving the tacking in until after they are scoured. Roll them through hot water on rolling machine well weighted down, letting them stand over night on the roll. In the morning reverse the roll end for end and let stay for two or three hours. Then unroll and nap.

Housatonic.

There are several causes for goods rolling. One may be that the listing is too narrow, which could be remedied by laying the list out one-third wider. The listing may also be too tight, or probably there is not enough space between the cloth and the list. It is often found that the list will full faster than the cloth.

Wilton.

---

## Carbonizing White Blankets

In carbonizing our white blankets we run them through a bath of oil of vitriol at about 10° Tw., then into a dryer at 200° to 220°, and on any work except white we get good results. The white blankets come out stained slightly yellow, which the bleaching does not entirely remove. Can you give us a method for carbonizing that will leave them pure white? We would also like some other method of bleaching than putting them in a sulphur house.

Gardner (851).

There are several things that might cause the yellow effect mentioned, but probably the principal one is a poor quality of oil of vitriol. If it tinges the white a pale yellow it is an evidence of a poor quality; probably it contains a percentage of iron. Carbonizing the goods too much will also cause it. This really means that the goods have too strong a bath, thus producing a yellow tinge, which is due to over carbonization. If the stain results from either of these things no amount of bleaching will remove it and give a clear white.

Again the temperature may be too high. If "Gardner" will try the bath at 8° Tw. and not have the dryer over 200° F., I think there will be an improvement. If not, then the oil of vitriol should be tested by an analyst to see if it contains traces of iron. If it does, he should get another supply that is free from it and try again.

In regard to bleaching, the makers and sellers of peroxide of sodium claim that it will bleach a pure white without tendering the goods.

Henry Douglas.

---

## Marking Woolen Cuts

We are making woolen and worsted cassimeres and have difficulty in deciphering the numbers on the cuts after the pieces are finished. What is the best method of marking cuts?

Odd Number (421).

The piece number, loom number, yards and ounces per yard should be sewed on the tail end of the piece with yarn that will when finished, be enough different from the piece in color to enable the figures to be easily read. Cotton yarn is usually used as it is not colored in dyeing the wool. Much depends on the manner in which the numbers are sewed on the cloth. Experience and a natural aptitude are required for this work. The figures should be plain and as small as possible so as not to waste cloth.

In most woolen mills the pieces are numbered in either the warping or weaving room. This number is sewed on the end of the woven cut and finally marked on the ticket when the piece is finished, providing it can be read on the cut. Frequently the number is either torn off or rendered illegible by rough usage in finishing. In such case a new number is given to the piece, with the resulting risk of having duplicate piece numbers.

An excellent method consists in so numbering the pieces in the warping room that the first cut number of each warp will end with 1. In this way the final figure in the number of the piece indicates the number of pieces woven from the same warp. For example, the pieces in four warps of 5, 7, 8 and 9 cuts respectively, will be numbered as follows:

| | |
|---|---|
| Warp No. 1 ..... | Nos. 1 to 5 |
| Warp No. 2 ..... | 11 to 17 |
| Warp No. 3 ..... | 21 to 28 |
| Warp No. 4 ..... | 31 to 39 |

The object in so numbering the woven cuts is to enable the operatives to know at once how many cuts have been woven before the one under observation. If, for instance, a wrong draw is found in a cut numbered 23, it is probable that the same imperfection will be found in one or more of the succeeding cuts of the warp, which are numbered from 24 to 28. Cases are constantly arising in the finishing department in which this method of numbering

the cuts proves of great value in tracing defects. It is specially adapted for woolen and worsted mills in which the number of cuts in one warp does not usually exceed 10.

Instead of retaining the old cut numbers, the finished pieces are numbered consecutively as they are measured and booked in the finishing room. The old or woven cut number is also booked to enable the piece to be traced back into the mill if necessary, but the new or finished piece number is the only one marked on the cloth ticket.

---

## Water Tanks

I am interested in the water pressure on sprinklers and hydrants and would like to have you explain how to make the calculation for the following problem: We want to erect a square tank to hold 3,000 gallons of water to supply our mill sprinklers and hydrants. What must be the size of this tank and what will 3,000 gallons of water weigh? Marin (343).

A gallon of distilled water weighs 8.34 lbs., and a cubic foot of water weighs 62½ lbs. It follows that the weight of the water and size of the tank in the case cited by Marin are calculated readily as follows:

3,000 (gallons) × 8.34 (lbs. per gallon) = 25,020 lbs. (12½ tons).

25,020 (lbs.) ÷ 62½ (lbs. per cu. ft.) = 400 cubic feet.

Cube root of 400 = 7.37 ft. (7 ft. 4½ in.) size of tank.

The difference in weight between distilled and ordinary river water is so slight as to be negligible in such calculations as these. The labor of calculation consists mainly in the extraction of the cube root, the determination of the weight of water and cubic capacity tank requiring a simple multiplication and division only.

---

## Chafing of Boucle Dress Goods

We have large orders on boucle dress goods and are troubled with the chafing of the loops during finishing. The selling samples were scoured by hand when finished and came out perfect, the loop being uninjured. The samples looked so well that we received large orders, but now that we have come to finish the pieces in the regular way we find that the loop is almost entirely destroyed by the finishing process. The result is that the goods are unmerchantable. Can you give us any information regarding the probable cause of this trouble, which is a very serious one with us at the present time? The goods are washed and not fulled, and then piece dyed, rinsed, dried, sheared and pressed. Capulet (351).

From the details given by our correspondent we judge that the trouble is caused by chafing in either the washing or piece dyeing kettle. As the loops in boucle yarn are very tender it is necessary to handle the goods with great care during the finishing process, otherwise they will be chafed and practically destroyed. Among the causes of this trouble are a too high speed

of the washer, or a difference in the circumference of the washer rollers. A great many cloth washers are running with rollers of different sizes in the same machine, as a consequence of which there is a continuous slipping where the rollers come in contact. This will readily destroy the loops in boucle dress goods. Whether the trouble lies in the washer or dye kettle can easily be determined by examining the pieces as they come from the washer and dye house. An excessively high speed of the reel or dragging over the rolls would also be likely to cause the trouble.

---

## Percentage of Cotton

How can I determine the proportion of cotton and wool in mixed goods? Test (517.)

Weigh a sample of the mixed goods and then boil for 20 minutes in a 10 per cent. solution of caustic soda or potash which can be obtained at any drug store. This treatment removes the wool and a small proportion, possibly 5 per cent., of the cotton. Rinse, dry and weigh the cotton residue. Add 5 per cent. to obtain the weight of the cotton. The difference between this and the total weight is the weight of the wool. It is well to enclose the sample in a small sack of cotton cloth while boiling it to prevent any loss of the material.

# INDEX


# Preparation
and
# Wet Finishing
# Machinery
for
## Woolens
and
## Worsteds

---

## James Hunter
## Machine Company
North Adams, Mass., U. S. A.